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Elise D. Bray

Appl No. : 09/775,315 Confirmation No. 8247
Applicant : Hyun-Sook Jung, et al.
Filed : February 1, 2001
Title : POSITIVE ACTIVE MATERIAL FOR RECHARGEABLE LITHIUM
BATTERY AND METHOD OF PREPARING SAME

TC/A.U. : 1745
Examiner : Julian A. Mercado

Docket No. : 41671/DBP/Y35
Customer No. : 23363

RESPONSE TO OFFICE ACTION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Post Office Box 7068
Pasadena, CA 91109-7068
August 6, 2003

Commissioner:

In response to the Office action of March 6, 2003, Applicant submits the following response. Claims 1 to 4 and 10 are pending. In view of the following remarks, Applicant respectfully requests favorable reconsideration and a timely indication of allowance.

The Examiner rejected claim 10 under 35 U.S.C. § 103(a) as obvious over Mayer (U.S. Patent No. 5,783,333). The Examiner rejected claims 1 to 4 under 35 U.S.C. § 103(a) as allegedly unpatentable over Pynenburg et al. (U.S. Patent No. 5,429,890) in view of Hasegawa et al. (U.S. Patent No. 5,370,948).

Claim 1 recites a positive active material for a rechargeable lithium battery comprising: lithium nickel manganese oxides; and lithium manganese oxides, wherein the weight ratio of the lithium manganese oxides to the lithium nickel manganese oxides is less than 1. Claim 10 contains similar limitations.

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Mayer discloses electrode materials containing lithium nickel cobalt metal oxides, which may be used in mixture with one or more other compounds, preferably lithium manganese oxides. (See column 4, lines 15 to 20.) Mayer states that the amount of each component can range from 0 to 100% (column 9, lines 19 to 20), but, as acknowledged by the Examiner, does not expressly teach the claimed ratio. The Examiner concludes the claimed ratio would be nonetheless obvious absent unexpected results.

Pynenburg discloses active materials containing a mixture of $\text{Li}_x\text{Mn}_2\text{O}_4$ and Li_xNiO_2 or Li_xCoO_2 ($0 < x \leq 2$). Pynenburg states that the two oxides can be present in a weight ratio of from about 1:10 to 10:1. (Column 7, lines 55 to 60.) As acknowledged by the Examiner, Pynenburg does not teach or suggest combining a lithium nickel manganese oxide with the lithium manganese oxide. The Examiner relies on Hasegawa to remedy this deficiency.

Hasegawa discloses an active material containing $\text{LiNi}_{1-x}\text{Mn}_x\text{O}_2$. Hasegawa states that the inclusion of this material improves the ease of synthesizing the active material and improves the properties of a cell containing the active material. The Examiner concludes that it would be obvious to replace the Li_xNiO_2 in the active material of Pynenburg with the $\text{LiNi}_{1-x}\text{Mn}_x\text{O}_2$ taught in Hasegawa. Further, the Examiner contends that, absent unexpected results, the claimed ratio is obvious as an optimizable parameter for result-effective variable.

Applicant submits herewith a Rule 132 Declaration by Hyun-Sook Jung, a coinventor of the present application. As explained in the Declaration, Mr. Jung prepared two cells containing different positive active materials. The first positive active material was made in accordance with the invention and contained a lithium manganese oxide and a lithium nickel manganese oxide in a weight ratio less than one. The second positive active material was made as a comparison and contained a lithium manganese oxide and a lithium nickel manganese oxide in a weight ratio greater than one. The two cells were charged and discharged at 0.1C at 4.3V to 3.0V, and the

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discharge capacity was measured. As can be seen from Table 1 and Figure 1 of the declaration, the discharge capacity of the cell containing a positive active material according to the invention is superior to that of the cell containing the comparative positive active material. As explained by Mr. Jung, the superior results achieved using the inventive positive active material were unexpected.


The evidence presented in the Rule 132 Declaration establishes that the claimed ratio results in a positive material having unexpectedly superior properties and thus overcomes any *prima facie* case of obviousness established by the Examiner. Applicant therefore respectfully requests that the rejections under section 103 be withdrawn.

In view of the foregoing remarks, Applicant respectfully submits that pending claims 1 to 4 and 10 are in condition for allowance, and a timely indication of allowance is respectfully requested. If there are any remaining issues that can be addressed by telephone, Applicant invites the Examiner to contact the undersigned at the number indicated below.

Respectfully submitted,

CHRISTIE PARKER & HALE, LLP

By


Kathleen M. Olster

Reg. No. 42,052

626/795-9900

KMO/edb

Enclosures: Rule 132 Declaration

Petition for Extension of Time with Fee

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